North Carolina Department of Public Instruction
INSTRUCTIONAL SUPPORT TOOLS
FOR ACHIEVING NEW STANDARDS

3rd Grade Mathematics ● Unpacked Contents
For the new Standard Course of Study that will be effective in all North Carolina schools in the 2018-19 School Year.

This document is designed to help North Carolina educators teach the 3rd Grade Mathematics Standard Course of Study. NCDPI staff are continually updating and improving these tools to better serve teachers and districts.

What is the purpose of this document?
The purpose of this document is to increase student achievement by ensuring educators understand the expectations of the new standards. This document may also be used to facilitate discussion among teachers and curriculum staff and to encourage coherence in the sequence, pacing, and units of study for grade-level curricula. This document, along with on-going professional development, is one of many resources used to understand and teach the NC SCOS.

What is in the document?
This document includes a detailed clarification of each standard in the grade level along with a *sample* of questions or directions that may be used during the instructional sequence to determine whether students are meeting the learning objective outlined by the standard. These items are included to support classroom instruction and are not intended to reflect summative assessment items. The examples included may not fully address the scope of the standard. The document also includes a table of contents of the standards organized by domain with hyperlinks to assist in navigating the electronic version of this instructional support tool.

How do I send Feedback?
Please send feedback to us at feedback@dpi.state.nc.us and we will use your input to refine our unpacking of the standards. Thank You!

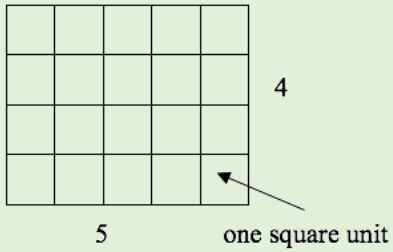
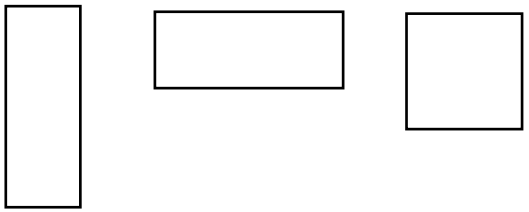
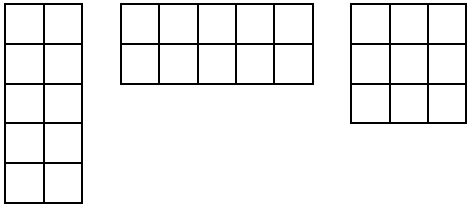
Just want the standards alone?
You can find the standards alone at http://www.ncpublicschools.org/curriculum/mathematics/scos/.

Standards for Mathematical Practice

Practice	Explanation and Example
1. Make sense of problems and persevere in solving them.	In third grade, mathematically proficient students know that doing mathematics involves solving problems and discussing how they solved them. Students explain to themselves the meaning of a problem and look for ways to solve it. Third grade students may use concrete objects or pictures to help them conceptualize and solve problems. They may check their thinking by asking themselves, "Does this make sense?" Students listen to other students' strategies and are able to make connections between various methods for a given problem.
2. Reason abstractly and quantitatively.	Mathematically proficient third grade students should recognize that a number represents a specific quantity. They connect the quantity to written symbols and create a logical representation of the problem at hand, considering both the appropriate units involved and the meaning of quantities.
3. Construct viable arguments and critique the reasoning of others.	In third grade, mathematically proficient students may construct arguments using concrete referents, such as objects, pictures, and drawings. They refine their mathematical communication skills as they participate in mathematical discussions that the teacher facilities by asking questions such as "How did you get that?" and "Why is that true?" They explain their thinking to others and respond to others' thinking.
4. Model with mathematics.	Mathematically proficient students experiment with representing problem situations in multiple ways including numbers, words (mathematical language), drawing pictures, using objects, acting out, making a chart, list, or graph, creating equations, etc. Students require extensive opportunities to generate various mathematical representations and to both equations and story problems, and explain connections between representations as well as between representations and equations. Students should be able to use all of these representations as needed. They should evaluate their results in the context of the situation and reflect on whether the results make sense.
5. Use appropriate tools strategically.	Mathematically proficient third grader students consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be helpful. For instance, they may use graph paper to find all the possible rectangles that have a given perimeter. They compile the possibilities into an organized list or a table, and determine whether they have all the possible rectangles.
6. Attend to precision.	Mathematically proficient third grader students develop their mathematical communication skills, they try to use clear and precise language in their discussions with others and in their own reasoning. They are careful about specifying units of measure and state the meaning of the symbols they choose. For instance, when figuring out the area of a rectangle they record their answers in square units.
7. Look for and make use of structure.	In third grade mathematically proficient students look closely to discover a pattern or structure. For instance, students use properties of operations as strategies to multiply and divide (commutative and distributive properties).
8. Look for and express regularity in repeated reasoning.	Mathematically proficient students in third grade should notice repetitive actions in computation and look for more shortcut methods. For example, students may use the distributive property as a strategy for using products they know to solve products that they don't know. For example, if students are asked to find the product of 7 x 8, they might decompose 7 into 5 and 2 and then multiply 5 x 8 and 2 x 8 to arrive at 40 + 16 or 56. In addition, third graders continually evaluate their work by asking themselves, "Does this make sense?"

Return to Standards

Understand the concept of area.
NC.3.MD.5 Find the area of a rectangle with whole-number side lengths by tiling without gaps or overlaps and counting unit squares.

Clarification	Checking for Understanding
This standard calls for students to explore the area as the covering of a region with unit squares. Students should understand that a unit square is a square with side length 1 unit and has one square unit of area and should be able to make connections between the number of squares it takes to cover an area and the dimensions of the rectangle. Students should be able to count the square units to find the area. Units could include metric, customary, or non-standard square units. **For example:** In the figure below, there are 20 square units. Each square unit is a square with the side length of 1 unit. The rectangle is 5 units long and 4 units wide.  	Use the square tiles and find the area of the shapes below. Which rectangle is the largest?  *Possible response:*  *The left and middle rectangles are 10 square units. The right rectangle is 9 square units. The left and middle rectangles are the largest.*

Return to Standards

Understand the concept of area.

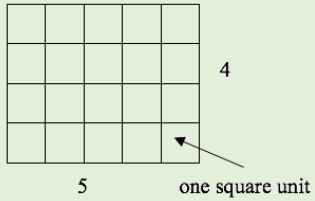
NC.3.MD.7 Relate area to the operations of multiplication and addition.

- Find the area of a rectangle with whole-number side lengths by tiling it and show that the area is the same as would be found by multiplying the side lengths.
- Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving problems and represent whole-number products as rectangular areas in mathematical reasoning.
- Use tiles and/or arrays to illustrate and explain that the area of a rectangle can be found by partitioning it into two smaller rectangles, and that the area of the large rectangle is the sum of the two smaller rectangles.

Clarification

In this standard, students build on their understanding of area. Students begin with unit squares and connect unit squares to side lengths. Students should understand and explain why multiplying the side lengths of a rectangle yields the same measurement of area as counting the number of tiles (with the same unit length) that fill the rectangle's interior. Students who multiply the dimensions to find the area without providing a clear reason why multiplying works have not met the expectation for this standard.

For example: In this rectangle, there are 4 rows of 5 units squares, or 5 columns of 4 unit squares. Students should tile rectangle to find that there are 20 square units, then multiply the side lengths to show it is the same.

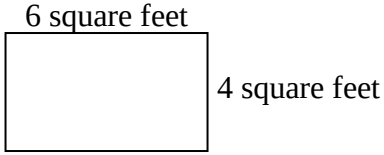


4 x 5 = 20
5 x 4 = 20

This standard also addresses using multiplication to determine area in problem solving. Students will also be expected to determine the possible dimensions of a rectangle when the area is given.

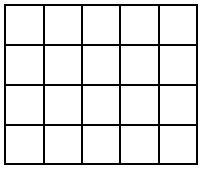
Checking for Understanding

Sam wants to tile the bathroom floor using 1 foot tiles. How many square foot tiles will he need?



You have a rectangle that is 5 inches by 4 inches. Explain why multiplying the dimensions of the rectangle is an appropriate strategy to find the area.

Possible responses:

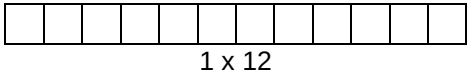


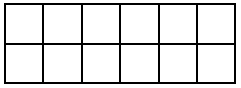
Student A: I know that I have 5 columns and 4 rows. I added the number 5, 4 times. 5+5+5+5 = 20. That is the same as 5x4 which is 20. Since I got the same answer when I added 5+5+5+5 and 5x4

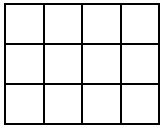
Student B: I counted all of the squares and there were 20. I know that 5x4 is 20 so I get the correct answer.

The area of a rectangular playpen for a guinea pig is 12 square yards. What are the possible dimensions of the playpen?

Possible response:


1 x 12

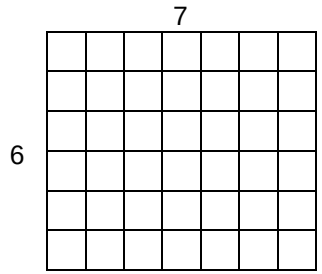
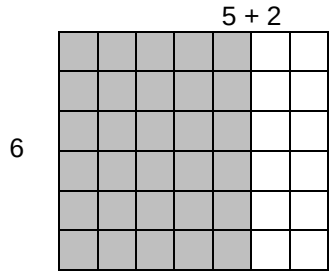
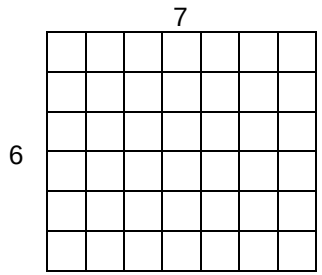
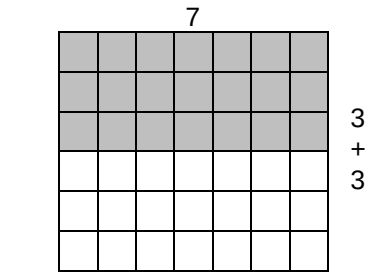

2 x 6


3 x 4

Understand the concept of area.

NC.3.MD.7 Relate area to the operations of multiplication and addition.

- Find the area of a rectangle with whole-number side lengths by tiling it and show that the area is the same as would be found by multiplying the side lengths.
- Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving problems and represent whole-number products as rectangular areas in mathematical reasoning.
- Use tiles and/or arrays to illustrate and explain that the area of a rectangle can be found by partitioning it into two smaller rectangles, and that the area of the large rectangle is the sum of the two smaller rectangles.

Clarification	Checking for Understanding
In this standard, students also connect area of a rectangle to the area model used to represent multiplication. This connection extends students' understanding of the distributive property. When students explain that they can find the area of a rectangle by breaking it into two smaller rectangles, every dimension of the rectangle that they partition should be equal to or less than 10.	You buy a rectangular carton of candy that has 7 columns and 6 rows. Find two different ways to split the rectangle.   7 x 6 = (5 x 6) + (2 x 6)   7 x 6 = (7 x 3) + (7 x 3)

Return to Standards

Understand the concept of perimeter. **NC.3.MD.8** Solve problems involving perimeters of polygons, including finding the perimeter given the side lengths, and finding an unknown side length.	
Clarification	**Checking for Understanding**
In this standard, students develop an understanding of the concept of perimeter. Students calculate the perimeter of polygons through addition and also recognize the patterns that exist when finding the sum of the lengths and widths of rectangles. When students are presented with a perimeter and some side lengths, students are able to determine an unknown side length. Students are also expected to find the possible side lengths of a rectangle when given the total perimeter.	You have 24 feet of fencing. What are the possible dimensions you can have for a rectangular fenced in area? *Possible response:* *The tallest and skinniest rectangle is 11 feet tall and 1 foot wide so it is 11 by 1. I then realized I could make shorter rectangles with the same perimeter. When I made one that was 10 tall the width was 2 so the dimensions were 10 by 2. I continued to do that so I had rectangles that were 9 by 3, 8 by 4, a 7 by 5, and 6 by 6.*

Return to Standards